$$Ac_{u_x} = d_{u_x} \, , \tag{128}$$

that can be solved for $\mathbf{c}_{ux}$. All the possible values for u_x yield the complete set of coefficients Crn (compare equation (112)) required for the method according to the invention.

Another possible calculation is the deterministic calculation. Statistic is not used as in the previous method of calculation to calculate the optimum selection of the coefficients Crn, r = 0, 1, 2, ..., R - 1. Since the actual data and all the previous data are known, it is possible to calculate the Fourier transformed of the transmitted sequence. The minimized criterion is the energy of the Fourier transformed contained in the fade-out range.

At least part of the subcarriers contained in at least one fade-out range and of the subcarriers adjacent to said fade-out range will be used as compensation sounds, their charge being thus calculated that the integral is minimized over the entire frequency range of the weighted, squared amplitude of the Fourier transformed of the data signal sent over a predetermined number of data blocks.

The system used for this embodiment of the method according to the invention is very similar to the system in the block diagram according to Fig. 33. The unique difference consists in the calculation unit for the compensation vector. As opposed to the previous statistical calculation, the actual and past data are not limited to a linear transformation.

The transmitting signal may be written as

$$s[n] = \sum_{l=-\infty}^{\infty} \left(A^T[l] h_U[n - lN] + c^T[l] h_I[n - lN] \right) + \mathrm{CC} \, . \tag{129}$$

The vector $c[l]$ contains the amplitudes of the compensation sounds. In the ideal case, the Fourier transformed of the complete sequence is calculated to the present and the coefficients are tried to be found that correspond to the smallest share of energy within the fade-out range. This creates two problems. First, for calculating the Fourier transformed, the complete sequence of all the past data is needed, which requires an infinitely large memory. Second, when the sequence starts in the infinite past, the sequence cannot be absolutely summed up and accordingly, the Fourier transformed cannot exist.

In order to overcome these problems, the sequence considered is not the complete one but only those sequences that are occasioned by the actual and the last R-1 data vectors. As a result thereof, the memory required becomes R-1 and the Fourier transformed exists on account of the finite sequence. The time domain considered may be written as

$$s[n] = \sum_{l=m-R+1}^{m} \left(A^T[l]h_U[n-lN] + c^T[l]h_I[n-lN]\right) + \mathrm{CC}\,. \tag{130}$$

The number m is the time index of the actual data vector and $m = \lfloor m/N \rfloor$. $A[l]$ and $c[l]$ with $l \neq m$ corresponds to the past data vectors and to the compensation vectors. $A[m]$ is the actual data vector, $c[m]$ is the actual compensation vector that has to be calculated.

The Fourier transformed of the equation (129) equals

$$S(e^{j\theta}) = \sum_{l=m-R+1}^{m} \Big(A^T[l] H_U(e^{j\theta}) + c^T[l] H_I(e^{j\theta}) + A^t[l] H_U^*(e^{-j\theta}) + c^t[l] H_I^*(e^{-j\theta}) \Big) e^{-j\theta l N} . \qquad (131)$$

The newly introduced value $Hu(e^{j\theta})$ contains the Fourier transformed $Hu(e^{j\theta})$ of the information transmitting sounds $h_u[m]$, $u \in K_u$.

$$H_U^T(e^{j\theta}) = \left[H_{u_1}(e^{j\theta})\ H_{u_2}(e^{j\theta})\ \dots\ H_{u_U}(e^{j\theta})\right] \qquad \{u_1, u_2, \dots, u_U\} = \mathcal{K}_U . \qquad (132)$$

The function that is to be optimized by the optimal choice of the c[m] now is the integral of the squared value $/S(e^{j\theta})/^2$ weighted by $W(e^{j\theta})$.

$$\psi_2(c[m]) = \int_0^{2\pi} W(e^{j\theta}) |S(e^{j\theta})|^2 \, d\theta \qquad (133)$$

When the weighting function $W(e^{j\theta})$ is selected as a rectangular window function, which corresponds to 1 within the fade-out range and to zero everywhere outside this range, the integral in the equation (133) corresponds to the energy inside the fade-out range.

As already explained in connection with the statistical calculation, this choice needs not be